



UNIVERSITY OF
BIRMINGHAM



中华人民共和国农业部
Ministry of Agriculture,
P.R.China

Funded by Defra and the Ministry of Agriculture of the People's Republic of China

COMPLEMENTARITY ANALYSIS

Joana Magos Brehm¹

¹Botanical Garden, National Museum of Natural History,
University of Lisbon (Portugal)

CWR China

Second training workshop
Thursday 13th January 2011

Contents



- Definition and principles
- Software
- DIVA-GIS complementarity analysis
- Application to PGR - examples

Definition and principles



- Aims at the identification of the minimum number of grid cells that are complementary to each other, capturing a maximum amount of diversity

Identify the fewest number of protected areas needed to effectively conserve all species

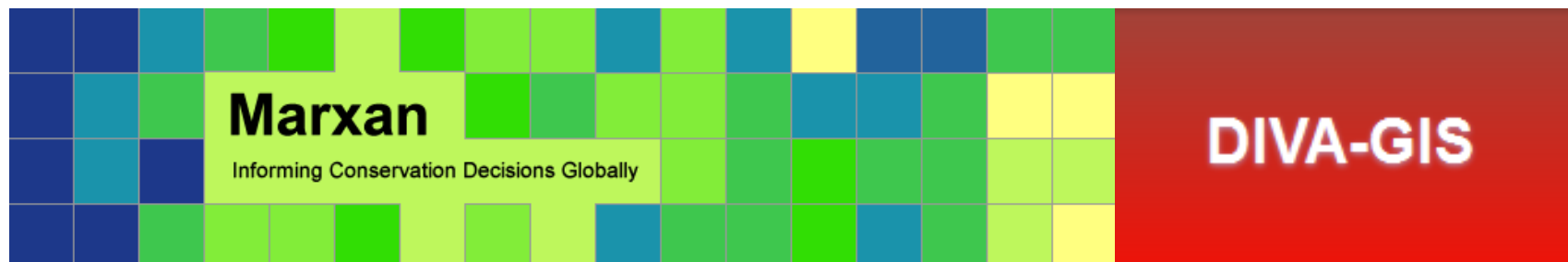
- There are many variants of complementarity

(see e.g. Rodrigues *et al.* 2000, Arponen *et al.* 2005):

- Single representations
- Multiple representations
- Percentage of range, etc.

Software

- DIVA-GIS (<http://www.diva-gis.org/>) (free)
- MARXAN (<http://www.uq.edu.au/marxan/>) (free)
- WORLDMAP (<http://www.nhm.ac.uk/research-curation/research/projects/worldmap/>) (demo free)



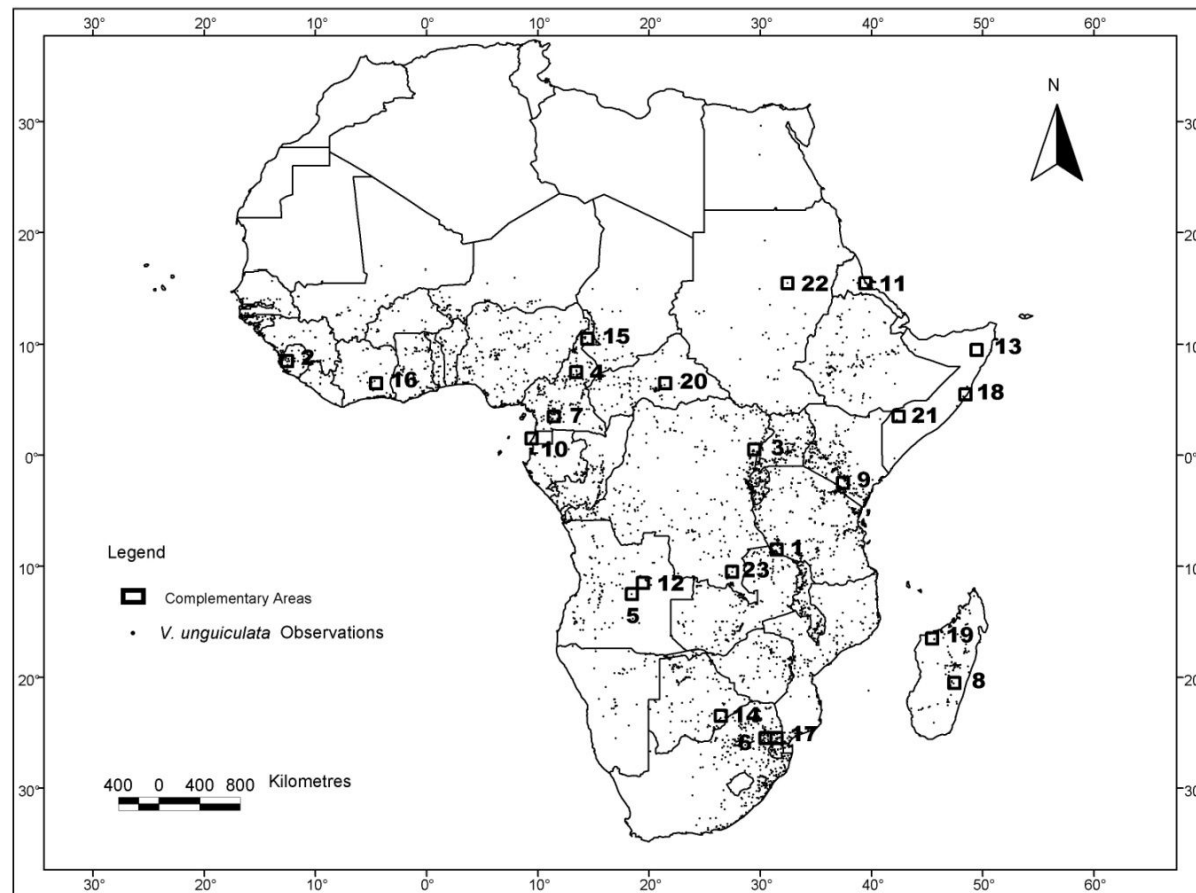
DIVA-GIS complementarity analysis



- Based on the algorithm described by Rebelo (1994)
- **Iterative procedure:** the first cell is the most species rich (or a random choice in case there are ties), the second iteration locates a grid cell that is the richest in species not already represented in the first iteration; this iterative process continues until all species have been represented (although they can also present taxa that have already been covered by previously selected grids)

Application to PGR - examples

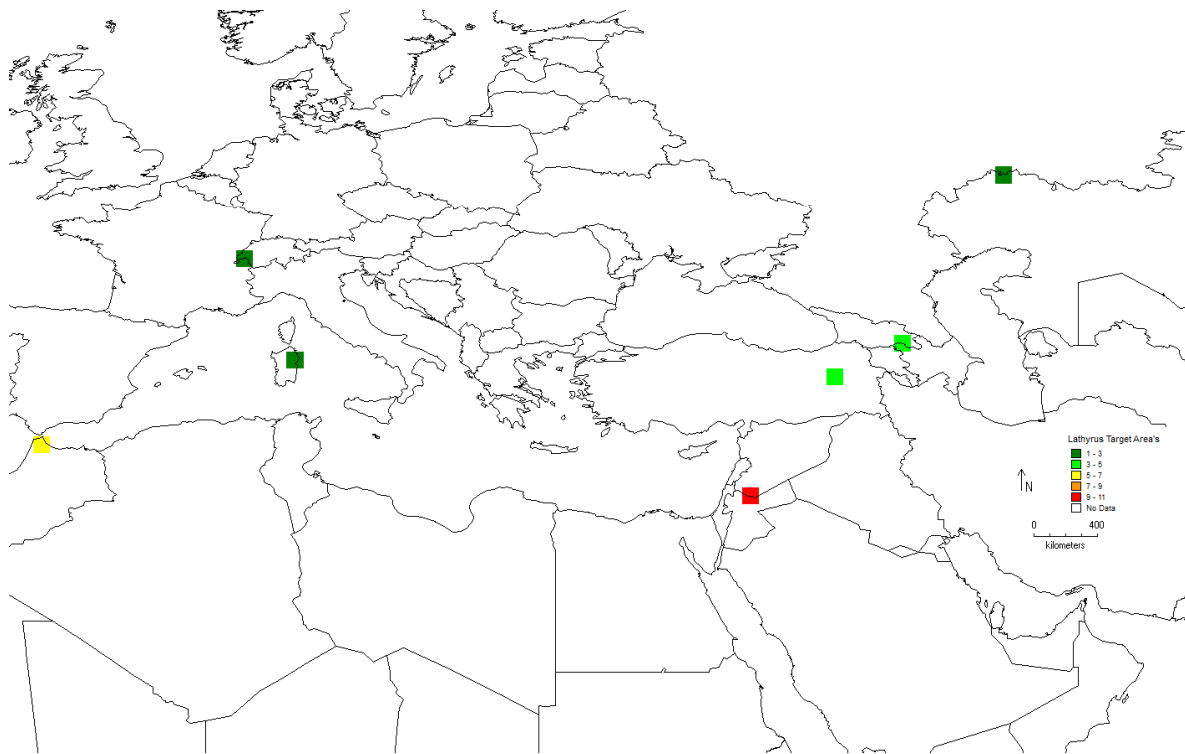
Vigna unguiculata in Africa



(Maxted *et al.* 2004)

Application to PGR - examples

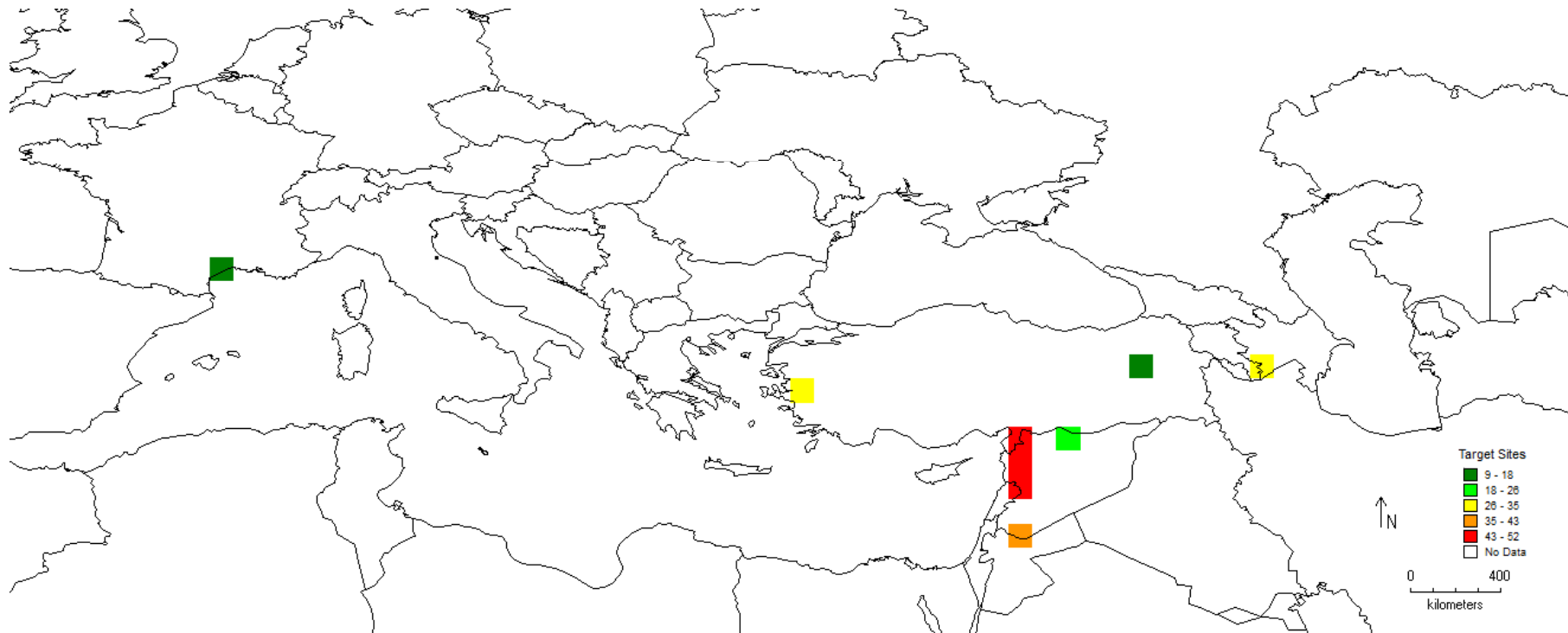
Priority *Lathyrus* spp.



(Maxted *et al.* 2011)

Application to PGR - examples

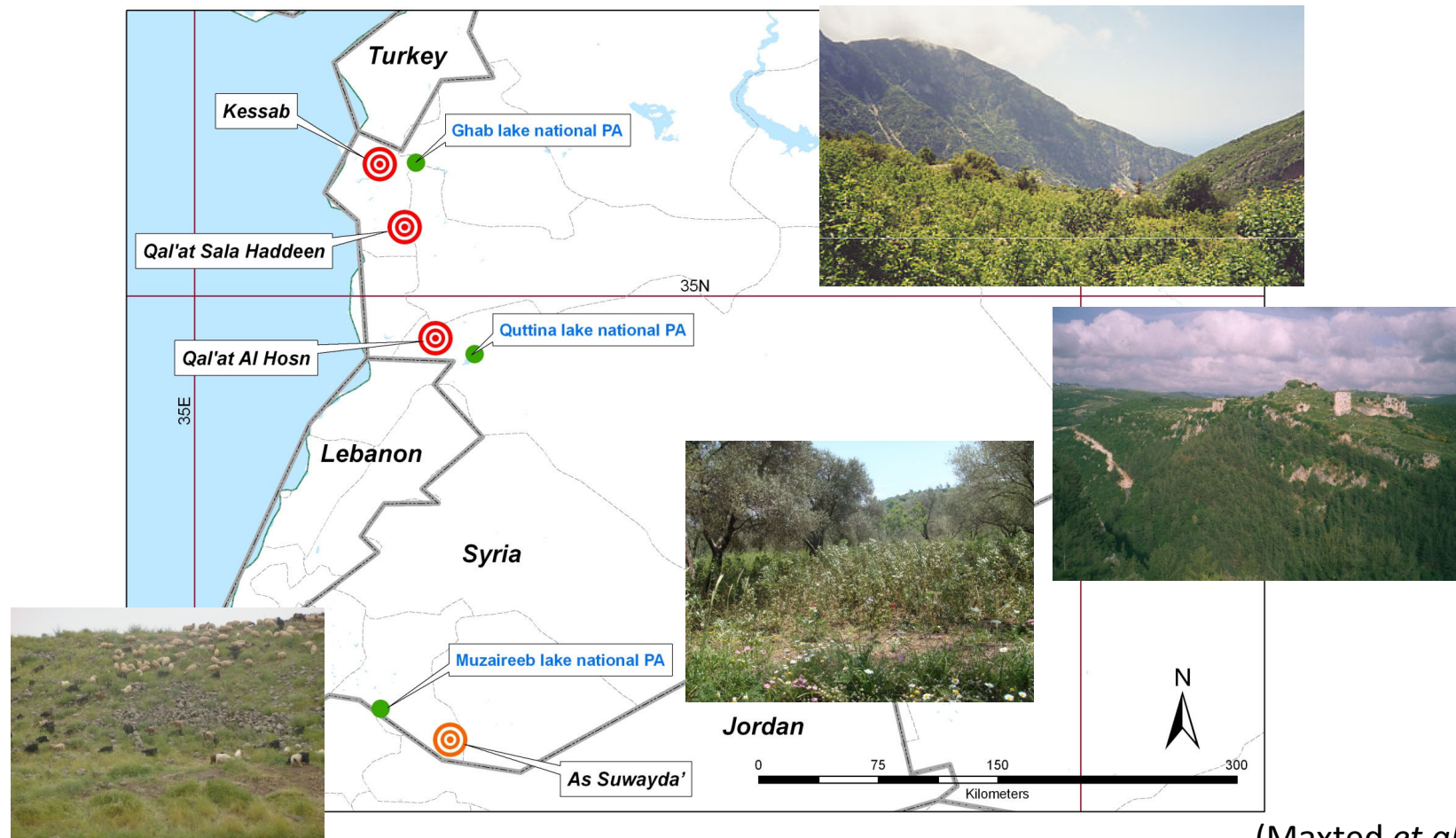
112 priority *Cicer*, *Lathyrus*, *Lens*, *Medicago*, *Pisum* and *Vicia* spp.



(Maxted *et al.* 2011)

Application to PGR - examples

Priority *Cicer*, *Lathyrus*, *Lens*, *Medicago*, *Pisum* and *Vicia* spp. (cont.)

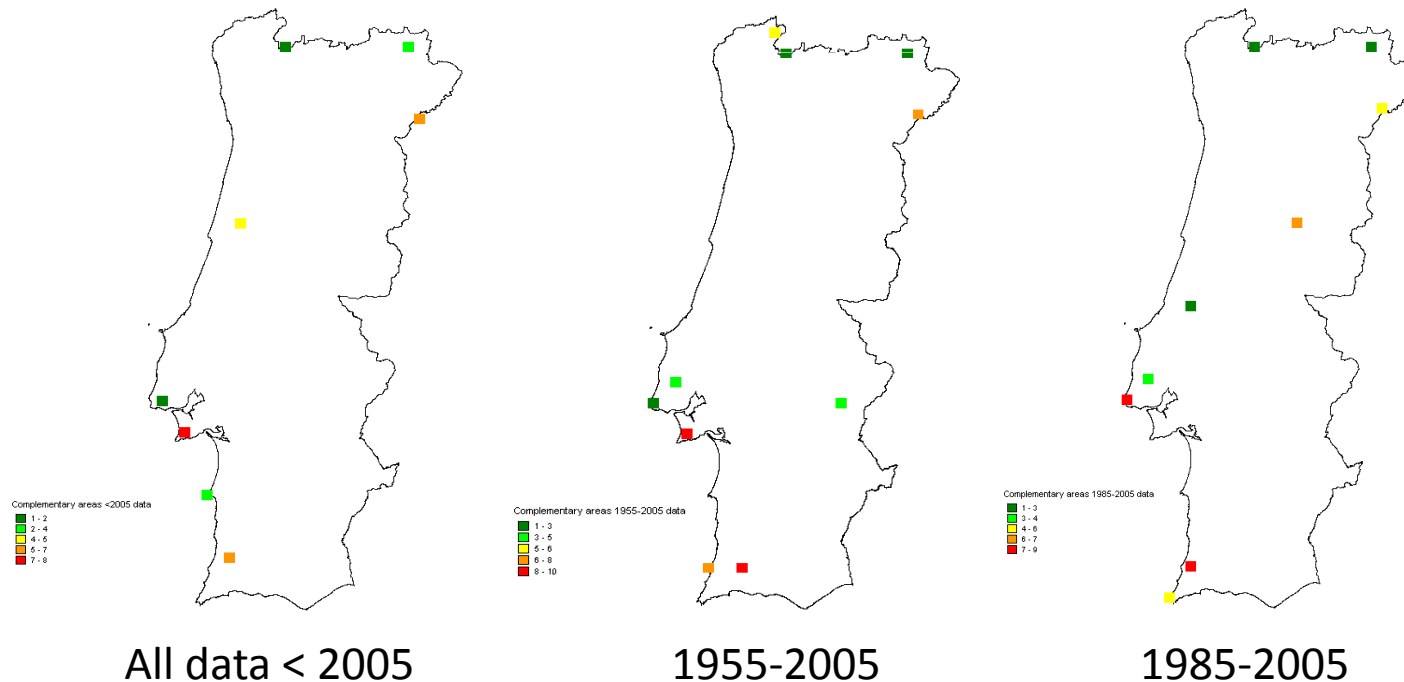


(Maxted *et al.* 2011)

Application to PGR - examples

Priority CWR Portugal

- Grid 10 x 10 Km
- Temporal comparison with 3 datasets: all data, data from the last 50 years (1955-2005), and from the last 20 years (1985-2005)
- Only records with an accuracy of 3-5 were

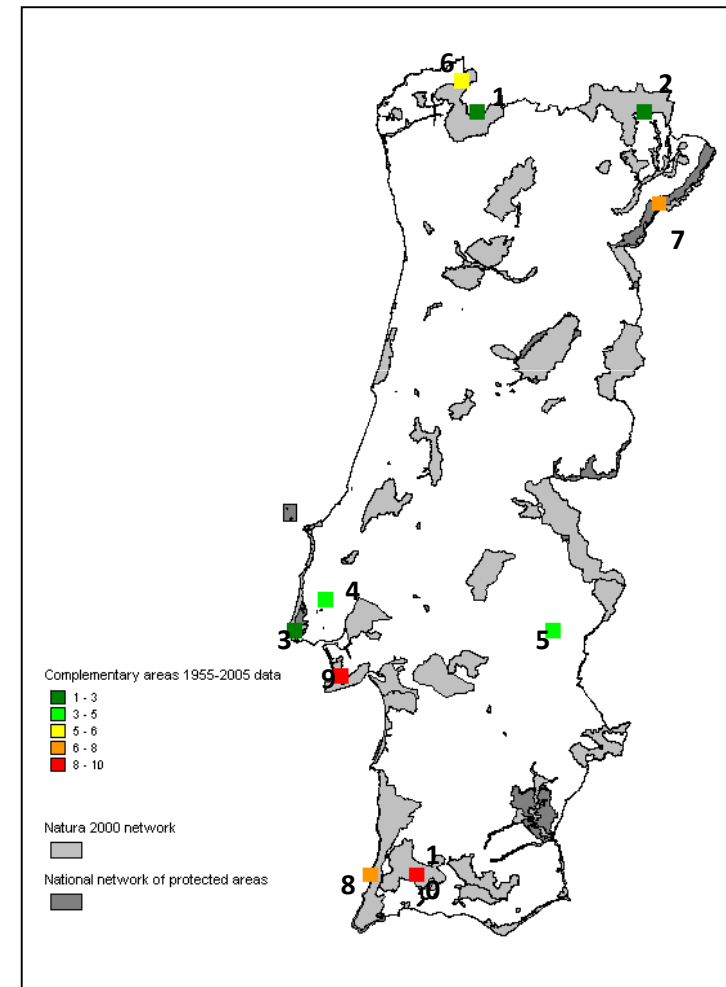


(Magos Brehm 2009)

Application to PGR - examples

Priority CWR Portugal (cont.)

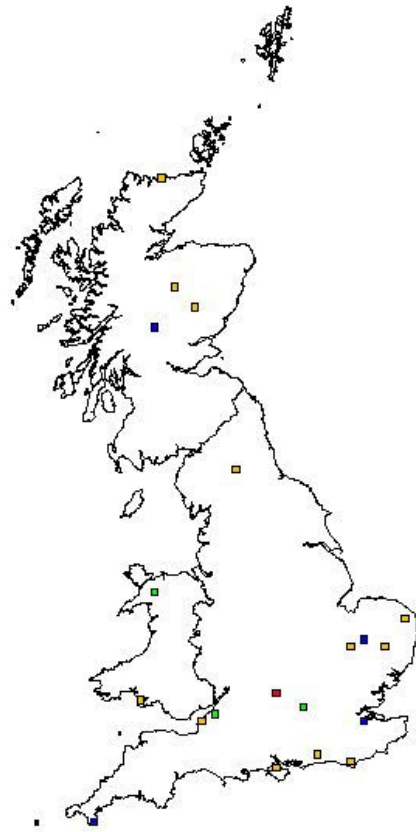
- 9 sites with 18 priority CWR
- 8 out of 10 sites are located within existing protected areas



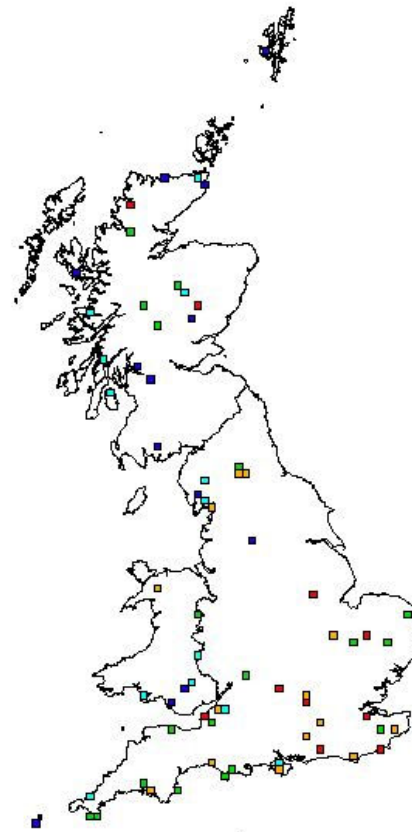
(Magos Brehm 2009)

Application to PGR - examples

Threatened CWR UK



20 sites covering 70% of all
threatened CWR



69 sites covering 100% of all
threatened CWR

(Codd 2005)



UNIVERSITY OF
BIRMINGHAM



中华人民共和国农业部
Ministry of Agriculture,
P.R.China

Funded by Defra and the Ministry of Agriculture of the People's Republic of China

COMPLEMENTARITY ANALYSIS

Joana Magos Brehm¹

¹Botanical Garden, National Museum of Natural History,
University of Lisbon (Portugal)

CWR China

Second training workshop
Thursday 13th January 2011